CLAIMS

This listing of claims replaces all prior listings of claims.

1. (Currently amended) A method comprising the acts of:

supplying an atomic layer deposition process gas to a process chamber, wherein a gas flow conductance is defined for gas exiting the chamber; and

varying a flux of the deposition process gas to a substrate in the process chamber by varying the gas flow conductance;

wherein varying the gas flow conductance comprises translating a at least one feature substantially circumscribing a periphery of the substrate~~, forming a variable aperture~~ by moving the at least one feature in a linear motion in a direction substantially perpendicular to a surface of the substrate to vary an aperture through which the gas exits the chamber;

wherein the at least one feature comprises a first aperture portion for forming a first variable conductance path and a second aperture portion for forming a second variable conductance path,

wherein varying the gas flow conductance further comprises varying the gas flow conductance through the first aperture portion during a deposition process, and varying the gas flow conductance through the second aperture portion while purging gases from the chamber after a deposition cycle, the second aperture portion being configured for providing a gas conductance that is different than a gas conductance achievable using the first aperture portion.

2. (Previously presented) The method of Claim 1 further comprising the act of maintaining a substantially constant flow rate of the gas into the chamber while varying the conductance.

3. (Previously presented) The method of Claim 1 wherein varying the conductance varies a flux of ions to the substrate.

4. (Previously presented) The method of Claim 1 wherein varying the conductance varies a

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flux of reactive atoms to the substrate.

5. (Previously presented) The method of Claim 1 wherein the flux of the gas on the substrate varies inversely with the conductance.

6. (Previously presented) The method of Claim 1 wherein a pressure in the process chamber varies inversely with the chamber conductance.

7. (Previously presented) The method of Claim 1 wherein varying the conductance comprises alternating the conductance between a first conductance and a second conductance, the second conductance being higher than the first conductance.

8. (Previously presented) The method of Claim 7 wherein the alternating between the first and second conductances is periodic.

9. (Previously presented) The method of Claim 7 further comprising the act of generating ions during first conductance periods.

10. (Previously presented) The method of Claim 7 further comprising the act of generating reactive atoms during first conductance periods.

11. (Previously presented) The method of Claim 7 further comprising the act of generating a plasma during first conductance periods.

12. (Previously presented) The method of Claim 11 wherein generating the plasma comprises applying RF power within the process chamber during first conductance periods.

13. (Previously presented) The method of Claim 11 wherein generating the plasma comprises applying constant RF power within the process chamber, and further comprising the acts of:

igniting the plasma by increasing chamber pressure by lowering the conductance; and

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extinguishing the plasma by decreasing chamber pressure by increasing the conductance.

14. (Original) The method of Claim 1 wherein said varying a flux is part of a deposition sequence, the deposition sequence comprising separating each of a plurality of low conductance periods from one another by one of a plurality of high conductance periods.

15. (Previously presented) The method of Claim 1 wherein the deposition process gas is a first deposition process gas, and further comprising the acts of:

using the first deposition process gas to form a monolayer on a surface of the substrate;

removing the first deposition process gas from the chamber;

introducing a second atomic layer deposition process gas to the process chamber;

generating ions from the second deposition process gas by igniting a plasma;

using the ions to promote a reaction between the second deposition process gas and the monolayer; and

removing the second deposition process gas;

wherein varying the conductance comprises increasing the conductance during the removing of the first deposition process gas, decreasing the conductance during the introduction of the second deposition process gas, and increasing the conductance during the removing of the second deposition process gas.

16. (Previously presented) The method of Claim 1 wherein the deposition process gas is a first deposition process gas, and further comprising the acts of:

using the first deposition process gas to form a monolayer on a surface of the substrate;

removing the first deposition process gas from the chamber;

introducing a second atomic layer deposition process gas to the process chamber;

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generating reactive atoms from the second deposition process gas by igniting a plasma;

reacting the reactive atoms with the monolayer to form a thin film; and

removing the second deposition process gas;

wherein varying the conductance comprises increasing the conductance during the removing of the deposition process gas, decreasing the conductance during the introduction of the second deposition process gas, and increasing the conductance during the removing of the second deposition process gas.

17. (Previously presented) The method of Claim 1 further comprising the act of introducing purge gas pulses to the process chamber.

18. (Previously presented) The method of Claim 17 wherein varying the conductance comprises varying the conductance between a first conductance and a second conductance, the second conductance being higher than the first conductance, wherein second conductance periods occur at the beginning and end of each purge gas pulse and a period of first conductance occurs between the second conductance periods.

19. (Currently amended) A method comprising the acts of:

establishing a first flux of a first atomic layer deposition process gas over a substrate positioned in a process chamber by setting a first conductance of gas exiting the chamber as the first process gas deposits a monolayer over a surface the substrate;

establishing a second flux of the first process gas over the substrate by setting a second conductance of the gas exiting chamber, higher than the first conductance, as the first process gas is removed from the chamber;

establishing a first flux of a second atomic layer deposition process gas over the substrate by setting a third conductance of the gas exiting chamber as the second process gas reacts with the deposited monolayer; and

establishing a second flux of the second process gas over the substrate by setting a

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fourth conductance of the gas exiting chamber, higher than the third conductance, as the second process gas is removed from the chamber,

wherein setting the first conductance, second conductance, third conductance, and fourth conductance comprises translating a at least one feature substantially circumscribing a periphery of the substrate~~, forming a variable aperture~~ by moving the at least one feature in a linear motion in a direction substantially perpendicular to a surface of the substrate to vary an aperture through which the gas exits the chamber,

wherein the at least one feature comprises a first aperture portion for forming a first variable conductance path and a second aperture portion for forming a second variable conductance path, the second aperture portion being configured for providing a gas conductance that is higher than a gas conductance achievable using the first aperture portion,

wherein establishing a first flux of a first atomic layer deposition process gas comprises varying the gas flow conductance through the first aperture portion, and

wherein establishing a second flux of the first process gas comprises varying the gas flow conductance through the second aperture portion.

20. (Currently amended) A method comprising the acts of:

supplying a process gas to a process chamber, wherein a gas flow conductance is defined for gas exiting the chamber; and

varying a flux of the process gas to a substrate in the process chamber by varying the gas flow conductance;

wherein varying the gas flow conductance comprises translating a at least one feature substantially circumscribing a periphery of the substrate~~, forming a variable aperture~~ by moving the at least one feature in a linear motion in a direction substantially perpendicular to a surface of the substrate to vary an aperture through which the gas exits the chamber,

wherein the at least one feature comprises a first aperture portion for forming a first variable conductance path and a second aperture portion for forming a second variable conductance path, the second aperture portion being configured for providing a gas conductance that is higher than a gas conductance achievable using the first aperture portion,

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varying a flux of the process gas to a substrate comprises varying the gas flow conductance through the first aperture portion,

the method further comprising varying a flux of the process gas to rapidly remove the process gas from the chamber by varying the gas flow conductance through the second aperture portion

21. (Currently amended)) The method of Claim 20 wherein translating at least one feature comprises moving a wall portion of the chamber to increase or decrease a gas exit opening in the chamber.

22. (Currently presented) The method of Claim 20 wherein translating a at least one feature comprises moving a portion of the chamber to increase or decrease a gas exit opening in the chamber.

23. (Currently presented) The method of Claim 20 wherein the substrate and the at least one feature have a common axis.

24. (New) The method of Claim 1 wherein the second aperture portion provides a gas conductance that is higher than a gas conductance achievable using the first aperture portion.

25. (New) The method of Claim 1 wherein the second aperture portion provides a gas conductance that is lower than a gas conductance achievable using the first aperture portion.

26. (New) The method of Claim 1 wherein the at least one feature has a top portion and a bottom portion, the first aperture portion being located at the bottom portion of the at least one feature, and the second aperture portion being located at the top portion of the at least one feature, wherein varying the gas flow conductance through the first aperture portion comprises lowering the at least one feature a first amount to only allow gas to flow through the first aperture portion, and wherein varying the gas flow conductance through the second aperture portion comprises lowering the feature a second amount for additionally allowing gas to flow through the second aperture portion.

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26. (New) The method of Claim 1 wherein the first aperture portion for forming a first variable conductance path and the second aperture portion for forming a second variable

conductance path are connected together such that linearly moving the at least one feature causes the first aperture portion and second aperture portion to move together.

27. (New) The method of Claim 19 wherein the first aperture portion for forming a first variable conductance path and the second aperture portion for forming a second variable conductance path are connected together such that linearly moving the at least one feature causes the first aperture portion and second aperture portion to move together.

28. (New) The method of Claim 20 wherein the first aperture portion for forming a first variable conductance path and the second aperture portion for forming a second variable conductance path are connected together such that linearly moving the at least one feature causes the first aperture portion and second aperture portion to move together.

29. (New) The method of Claim 1 wherein the first aperture portion for forming a first variable conductance path and the second aperture portion for forming a second variable conductance path are connected together such that linearly moving the at least one feature causes the first aperture portion and second aperture portion to move together.

30. (New) The method of Claim 1 wherein the first aperture portion forms a shadow ring hook, the method further comprising linearly moving the feature to lift the shadow ring hook to lift a shadow ring off the substrate, the shadow ring preventing deposition on the substrate under the shadow ring.

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